CLAIMS

1. A charger for charging a secondary battery through a charging unit configured to control input power to be constant by using, as an input source, a fuel cell, a solar cell, or the like, having a relatively large impedance in a power-supply mode, comprising: a current-control circuit that is connected to the secondary battery, and a constant-power-reference-voltage control circuit that is connected between the current-control circuit and an input of the charger, wherein the constant-power-reference-voltage control circuit is configured so that, when an output of the charger is in a drooping state, by decreasing a reference voltage to increase supply power, constant power is obtained at a voltage determined by output-voltage-stabilizing control of the charger, and, when input power to the charger is in an excessive state, by raising the reference voltage, a reference value corresponding to the supply power is set.

2. The charger according to claim 1, wherein the constant-power-reference-voltage control circuit includes two constant current circuits, an input-voltage detecting comparator, an output-voltage detecting comparator, and a reference-voltage capacitor, and the constant-power-reference-voltage control circuit is configured so that, when an output detected by the output-voltage detecting

comparator is in a drooping state, by causing the reference-voltage capacitor to discharge through the constant current circuit to raise the output voltage, constant power is obtained at the voltage determined by controlling output voltage of the charger to be stabilized, and, when input power detected by the input-voltage detecting comparator is in an excessive state, by charging the reference-voltage capacitor through the constant current circuit, the reference value corresponding to the supply power is set.

3. A control circuit in the charger according to claim 1 for controlling input power to be constant by using, as an input source, a fuel cell, a solar cell, or the like, having a relatively large impedance in a power-supply mode, wherein the control circuit includes a constant-power-reference-voltage control circuit in which, when the output of the charger is in a drooping state, by decreasing a reference voltage to increase supply power, constant power is obtained at a voltage determined by controlling output voltage of the charger to be stabilized, and, when input power to the charger is in an excessive state, by raising the reference voltage, a reference value corresponding to the supply power is set.

4. The control circuit in the charger, according to claim

3, wherein the constant-power-reference-voltage control circuit includes two constant current circuits, an input-voltage detecting comparator, an output-voltage detecting comparator, and a reference-voltage capacitor, and wherein the constant-power-reference-voltage control circuit is configured so that, when an output detected by the output-voltage detecting comparator is in a drooping state, by causing the reference-voltage capacitor to discharge through the constant current circuit to raise the output voltage, constant power is obtained at the voltage determined by controlling output voltage of the charger to be stabilized, and, when input power detected by the input-voltage detecting comparator is in an excessive state, by charging the reference-voltage capacitor through the constant current circuit, the reference value corresponding to the supply power is set.

5. The control circuit in the charger, according to claim 3, further including a secondary battery provided at an output of the charger in parallel to an arbitrary load, and a current control circuit connected to the secondary battery, wherein the current control circuit is configured so that, by performing control so that, when a current in the load decreases, a charging current flowing into the secondary battery is increased, and, when the current in the

load increases, the charging current to the secondary battery is decreased, whereby an output voltage is maintained at a set drooping voltage.

6. The control circuit in the charger, according to claim 4, further including a secondary battery provided at an output of the charger in parallel to an arbitrary load, and a current control circuit connected to the secondary battery, wherein the current control circuit is configured so that, by performing control so that, when a current in the load decreases, a charging current flowing into the secondary battery is increased, and, when the current in the load increases, the charging current to the secondary battery is decreased, whereby an output voltage is maintained at a set drooping voltage.

7. A DC-DC converter for controlling input power to be constant by using, as an input source, a fuel cell, a solar cell, or the like, having a relatively large output impedance in a power-supply mode, wherein the DC-DC converter includes a charger according to claim 1, and a secondary battery is provided at an output in parallel to an arbitrary load, and wherein a current control circuit is connected to the secondary battery, and a constant-power-reference-voltage control circuit is connected between the

current control circuit and an input of the DC-DC converter, and the constant-power-reference-voltage control circuit is configured so that, when an output of the DC-DC converter is in a drooping state, by decreasing a reference voltage to increase supply power, constant power is obtained at a voltage determined by controlling output voltage of the DC-DC converter to be stabilized, and, when input power to the DC-DC converter is in an excessive state, by raising the reference voltage, a reference value corresponding to the supply power is set.

8. The DC-DC converter according to claim 7, wherein the constant-power-reference-voltage control circuit includes two constant current circuits, an input-voltage detecting comparator, an output-voltage detecting comparator, and a reference-voltage capacitor, and wherein the constant-power-reference-voltage control circuit is configured so that, when an output detected by the output-voltage detecting comparator is in a drooping state, by causing the reference-voltage capacitor to discharge through the constant current circuit to raise the output voltage, constant power is obtained at the voltage determined by controlling output voltage of the DC-DC converter to be stabilized , and, when input power detected by the input-voltage detecting comparator is in an excessive state, by charging the

reference-voltage capacitor through the constant current circuit, the reference value corresponding to the supply power is set.

9. A control circuit in the DC-DC converter according to claim 7 for controlling input power to be constant by using, as an input source, a fuel cell, a solar cell, or the like, having a relatively large impedance in a power-supply mode, wherein the control circuit includes a constant-power-reference-voltage control circuit in which, when an output of the DC-DC converter is in a drooping state, by decreasing a reference voltage to increase supply power, constant power is obtained at a voltage determined by controlling output voltage of the DC-DC converter to be stabilized, and, when input power to the DC-DC converter is in an excessive state, by raising the reference voltage, a reference value corresponding to the supply power is set.

10. The control circuit in the DC-DC converter according to claim 9, wherein the constant-power-reference-voltage control circuit includes two constant current circuits, an input-voltage detecting comparator, an output-voltage detecting comparator, and a reference-voltage capacitor, and wherein the constant-power-reference-voltage control circuit is configured so that, when an output detected by the

output-voltage detecting comparator is in a drooping state, by causing the reference-voltage capacitor to discharge through the constant current circuit to raise the output voltage, constant power is obtained at the voltage determined by controlling output voltage of the DC-DC converter to be stabilized, and, when input power detected by the input-voltage detecting comparator is in an excessive state, by charging the reference-voltage capacitor through the constant current circuit, the reference value corresponding to the supply power is set.

11. The control circuit in the DC-DC converter according to Claim 9, further including a secondary battery provided at an output of the DC-DC converter in parallel to an arbitrary load, and a current control circuit connected to the secondary battery, wherein the current control circuit is configured so that when a current in the load decreases, a charging current flowing into the secondary battery is controlled to be increased, and, when the current in the load increases, the charging current to the secondary battery is decreased, so that an output voltage is maintained at a set drooping voltage.

12. The control circuit in the DC-DC converter according to claim 10, further including a secondary battery provided

at an output of the DC-DC converter in parallel to an arbitrary load, and a current control circuit connected to the secondary battery, wherein the current control circuit is configured so that when a current in the load decreases, a charging current flowing into the secondary battery is controlled to be increased, and, when the current in the load increases, the charging current to the secondary battery is decreased, so that an output voltage is maintained at a set drooping voltage.